

**NATURAL RESOURCES CONSERVATION SERVICE
VIRGINIA TECHNICAL NOTE**

Agronomy - Residue Management/Tillage #1

MANAGING AND MEASURING CROP RESIDUE

MANAGEMENT OF RESIDUE

Management decisions about the amount of crop residue left on the field after harvest can affect the future productivity of the field by altering the organic matter content and the amount of nutrients in the soil profile after the residue decays. More importantly though, the crop residue on the soil surface can prevent detachment and transportation of the soil itself. The amount of residue required for surface cover will be based on the desired reduction in soil loss attributed directly to the crop residue. The amount of residue needed can be determined using the Revised Universal Soil Loss Equation (RUSLE).

Residue may be left unshredded, shredded, chiseled, or disked in the fall, winter, or spring. Living residue, to be used for ground cover, must be killed no earlier than 30 days before planting.

METHODS FOR ESTIMATING AMOUNT OF CROP RESIDUE

A. Residue Estimated from Crop Yield

Table 1, "Estimate of Residue Production", provides conversion factors for determining the amount of residue (in pounds) produced by different crops. To determine the amount of residue available, determine the crop yield and multiply the yield by the appropriate factor. Use Figure 1 to convert the pounds of residue to a percent cover.

Example: A corn field yields 100 bu. per acre. How much ground cover is present? (100 bu.) x (conversion factor of 75) = 7500 pounds of corn residue on the surface. From Figure 1, it is determined that there is 97% cover.

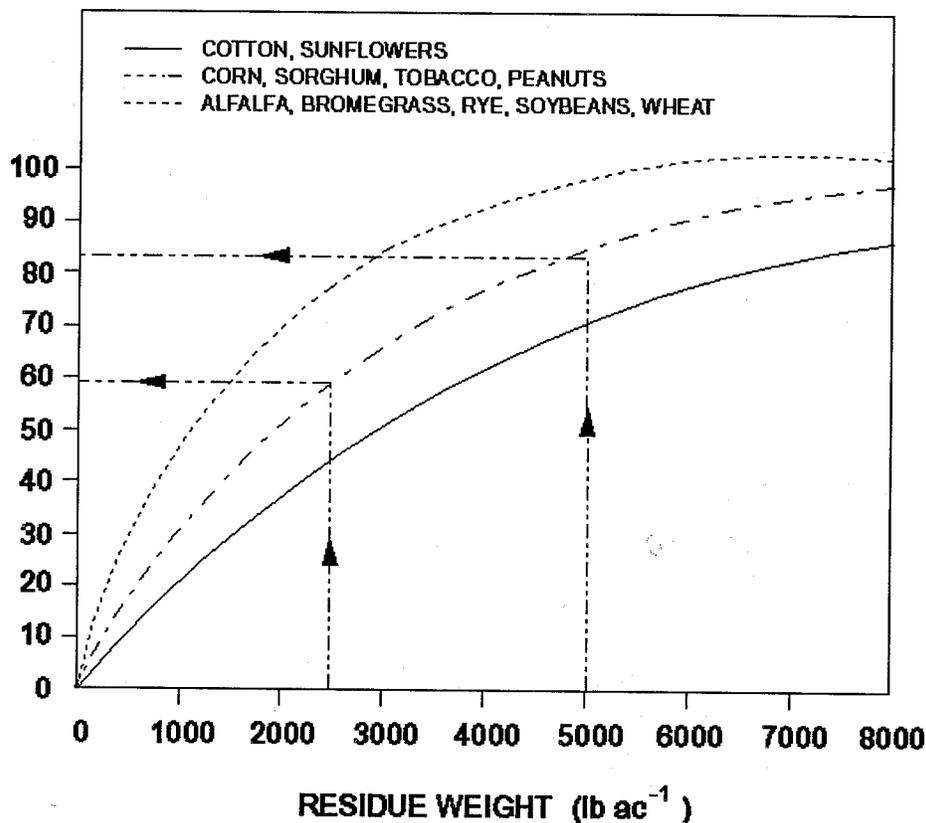
The following amounts of crop residues represent approximately 60% surface cover and are approximately equal in effectiveness.

Corn: 2,600 lbs.
Small Grain: 1,500 lbs.
Soybeans: 1,500 lbs.
Killed Sod: 3,000 lbs.

TABLE 1 ESTIMATE OF RESIDUE PRODUCTION*		
CROP	UNIT	CONVERSION FACTORS
Corn	bu.	75
Grain Sorghum	lbs.	1.35
Soybeans	bu.	60
Wheat	bu.	100
Barley	bu.	70
Oats	bu.	80
Rye	bu.	90
Peanuts	bu.	1.14
Cotton	bale	5

*Estimates vary by climate, variety, and management.

Figure 1. Conversion of crop residue from pounds to percent cover. From AH 703, Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE)



B. Residue Estimated from the Line-Transect Method

The line transect method is a statistically reliable method of measuring percent of surface cover. Stretch a 100 foot tape, or 100 foot cam-line, diagonally across the rows. Check every foot mark to see if that point touches a piece of residue. The total number of points that touches a piece of residue will represent the percent of residue cover that is in the field. It is very important that the person making the measurements look straight down on the each tape or marker, and take all readings on the same side of the cam-line or tape so that consistency can be maintained. Three measurements typical of the field are averaged to get the percent residue cover for the field.

C. Effects of Tillage

Table 2 provides information on the reduction of crop residue amounts when different tillage tools are used.

TABLE 2 REDUCTION OF SURFACE RESIDUE		
TILLAGE OPERATION	PERCENT OF CROP RESIDUE REMAINING AFTER TILLAGE**	
	NON-FRAGILE RESIDUE	FRAGILE RESIDUE
Chisel Plow, Straight Shanks	60-80	40-60
Chisel Plow, Twisted Shanks	50-70	30-40
Field Cultivator, With Sweeps	70-80	50-60
Tandem Disk after harvest & before other tillage	70-80	40-50
Tandem Disk after previous tillage	40-70	25-40
Moldboard Plow	0-10	0-5
Over Winter Decomposition	80-95	70-80
No-Till Planting	85-95	75-85

**These values were determined primarily with corn and small grain residues. The lower end of the percentage range listed corresponds to fragile residues, such as the residue from soybeans. The upper end of the percentage range listed corresponds to such non-fragile residues as corn and small grain.

Example: A corn field with 6,000 pounds of residue on the soil surface is chisel plowed with straight shanks. The residue remaining is $(6,000 \text{ lbs.}) \times (80\%) = 4,800 \text{ lbs.}$ of residue left on the soil surface. It is then disked once with a tandem disc in preparation for planting. The residue remaining is $(4,800 \text{ lbs.}) \times (50\%) = 2,400 \text{ lbs.}$ From Figure 1, the percent cover is 58%.

NOTE: A plus or minus of 5% deviation from the planned percent of residue cover is permissible.

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